11-1973

Diphyllobothrium ursi from Man in British Columbia--First Report of This Tapeworm in Canada

Leo Margolis
Fisheries Research Board of Canada, Nanaimo, British Columbia

Robert L. Rausch
Arctic Health Research Center, rausch@u.washington.edu

E. Robertson
Lions Gate Hospital, North Vancouver, British Columbia

Margolis, Rausch & Robertson in Canadian Journal of Public Health (November-December 1973) 64(6).

DIPHYLLOBOTHRIUM URSI FROM MAN IN BRITISH COLUMBIA—FIRST REPORT OF THIS TAPEWORM IN CANADA

L. MARGOLIS[1], PH.D., R. L. RAUSCH[2], D.V.M., PH.D., and E. ROBERTSON[3], M.D., F.R.C.P.(C)

A case of human infection in British Columbia by the tapeworm Diphyllobothrium ursi *is reported and the likely source of infection is discussed. This is the first report of* D. ursi *in Canada and the third from man.*

ON January 7, 1973, a portion of a tapeworm strobila was passed spontaneously by a 15-year-old male resident of North Vancouver, British Columbia and submitted to the pathology laboratory of Lions Gate Hospital. The specimen was 758 mm. (29.8 in.) long with a maximum width of 11 mm. (0.43 in.) and consisted of 543 segments. We have identified it as *Diphyllobothrium ursi* Rausch, a species originally described (1) from brown bear, *Ursus arctos* Linnaeus, from Kodiak Island, Alaska, and subsequently reported (2) from black bear, *Ursus americanus* Pallas, and man in Alaska.

On January 6, the boy had passed an even larger strobila than that submitted to the pathology laboratory. Although he was treated on January 9 (the day he reported to his physician) with quinacrine (atabrine, mepacrine) he has not to his knowledge passed any further segments and the scolex has not been recovered. Stool examinations performed on January 26, February, 6, and March 8 were negative for *Diphyllobothrium* eggs.

There are three other members in the patient's family, all of whom proved negative for *Diphyllobothrium* by fecal examination.

The following facts are relevant to a consideration of the possible source of the tapeworm infection. The boy's father is a salmon fisherman and is often accompanied by his son on fishing trips in coastal waters of British Columbia, the last, prior to recovery of the tapeworm, terminating in the first week of September, 1972. On board ship apparently only cooked fish were eaten, but the mother preserves salmon for home use by pickling in brine. Because cysts containing *D. ursi* plerocercoid larvae apparently occur only on the visceral organs of salmon and possibly other salmonid fishes, salmon flesh was not likely the source of the patient's infection. However, this source cannot be entirely discounted because of possible postmortem contamination of the flesh, either through escape of plerocercoids from their cysts and migration to the flesh or by cysts dislodged during cleaning of the fish. Such larvae reaching the flesh might survive insufficient cooking or pickling. The most likely source of the infection was a home-prepared salmon liver paste. It had been made by a friend of the patient's family from fresh salmon livers provided by the father when he returned from his fishing trip in early September. The boy was the only member of the family who ate much of it. The livers from more than one species of salmon were pooled when preparing the paste, but a record of the identity of the species was not kept.

1. Head, Experimental Biology and Pathology, Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B.C.
2. Chief, Infectious Disease Section, Arctic Health Research Center, United States Department of Health, Education and Welfare, Fairbanks, Alaska.
3. Pathologist, Lions Gate Hospital, 230 East 13th Street, North Vancouver, B.C.

Although the patient presumably acquired his tapeworm through eating a product made from salmon caught at sea, it is emphasized that *D. ursi* basically is a parasite associated with the freshwater environment. Anadromous Pacific salmons become infected during their early life in fresh water, particularly in lakes. The plerocercoids remain viable throughout the marine life of the salmon and are brought back to fresh water to complete their life cycle when the salmon returns to spawn.

Rausch (1) partially elucidated the life cycle of *D. ursi* in the Karluk Lake region of Kodiak Island. The plerocercoid stage was commonly found in small cysts on the stomach serosa of sockeye salmon, *Oncorhynchus nerka* (Walbaum). Several other species of fishes examined from Karluk Lake were free of *Diphyllobothrium* plerocercoids. In some areas of British Columbia, similar cysts containing *Diphyllobothrium* pleroceroid larvae, are frequently found in sockeye salmon and occasionally in coho salmon, *Oncorhynchus kisutch* (Walbaum) (3, 4). The ovoidal to spherical cysts, measuring 2.0-3.5 mm. by 1.0-2.5 mm., are usually found on the stomach serosa but may also occur on the serosa of the pyloric ceca; occasionally a cyst can be found on the liver or spleen. Based on Rausch's report (1) that sockeye salmon is the common, if not the only, host of the plerocercoids of *D. ursi* in Karluk Lake and on the present record establishing the presence of *D. ursi* in British Columbia, it is concluded that at least some of the visceral *Diphyllobothrium* plerocercoids occurring in British Columbia salmon belong to *D. ursi*.

Bears are the most important natural definitive hosts of *D. ursi* (1, 2). Man may become infected through eating fish products that have not been cooked or treated in some other way that ensures the death of plerocercoids. However, even among peoples who habitually eat uncooked fish, the chances of infection by this species are low because the plerocercoid stage, unlike that of the well-known broad fish tapeworm, *Diphyllobothrium latum* (Linnaeus), does not reside in the body musculature of the fish intermediate host.

The present report of *D. ursi* represents the first in Canada, the third from man and the southernmost for this species. The previous two records from man were from Karluk Village on Kodiak Island and Fort Yukon (66° 35′ N, 145° 20′W), Alaska. So far *D. ursi* is known only from northwestern North America.

ACKNOWLEDGEMENT

We are grateful to the attending physician, Dr. P. M. Alderman, for his co-operation in providing information relative to the case history.

L'auteur rapporte la présence chez un être humain du ténia Diphyllobothrium ursi, *cas qui s'est présenté en Colombie britannique, et considère la source probable d'infection. C'est le premier cas de ce genre au Canada et la troisième fois que la présence du* D. ursi *est constatée chez un être humain.*

REFERENCES

1. Rausch, R.: "Studies on the helminth fauna of Alaska. XXI. Taxonomy, morphological variation, and ecology of *Diphyllobothrium ursi* n. sp. provis. on Kodiak Island." J. Parasitol., 1954, *40*: 540.
2. Rausch, R. L., and Hilliard, D. K.: "Studies on the helminth fauna of Alaska. XLIX. The occurrence of *Diphyllobothrium latum* (Linnaeus, 1758) (Cestoda: Diphyllobothriidae) in Alaska, with notes on other species." Can. J. Zool., 1970, *48*: 1201.
3. Margolis, L.: "Parasites as indicators of the geographical origin of sockeye salmon, *Oncorhynchus nerka* (Walbaum), occurring in the North Pacific Ocean and adjacent seas." Bull. Int. North Pacific Fish. Comm., 1963, *11*: 101.
4. Margolis, L.: Unpublished data.